

## Claims

1. A preparation comprising encapsulated chelating agents comprising at least one member of a first group, at least one member of a second group and at least one member of a third group,

wherein members of the first group are selected from the group consisting of R-(+)-alpha-lipoic acid, S-(-)-alpha-lipoic acid, R/S-alpha-lipoic acid, R/S-gamma-lipoic acid, isomers of alpha lipoic acid, dihydrolipoic acid or DHLA, animal and vegetable oils, hydrocarbon oils, ester oils, silicone oils, higher fatty acids, higher alcohols, sun-screening agents, vitamins, and ferulic acid;

members of the second group comprises at least one chelating group; and

members of the third group are selected from the group consisting of lecithin, phosphatidylcholine, phosphatidylserine, phosphatidylethanolamine, dilinoleylphosphatidylcholine, lysolipids, dipalmitoylphosphatidylcholine, distearoylphosphatidylcholine, phosphatidylcholine, phosphatidic acid, sphingomyelin, cholesterol, cholesterol sulfate, cholesterol hemisuccinate, tocopherol hemisuccinate, phosphatidylethanolamine, phosphatidylinositol, fatty acids, palmitic acid, stearic acid, oleic acid, linolenic acid, linoleic acid, glycosphingolipids, glucolipids, glycolipids, sulphatides, lipids bearing sulfonated mono-, di-, oligo- or polysaccharides, lipids with ether and ester-linked fatty acids, triglycerides, lipoproteins, cholesterol, a lipid and a polymerized lipid,

wherein at least about 1% of members from the first, second or third group in the preparation are encapsulated in a microsphere or a liposome, and the microsphere or liposome comprises a member of the third group,

wherein optionally one or more members of the first group, one or more members of the second group, and one or more members of the third group are admixed to generate a microsphere or a liposome.

2. A preparation comprising encapsulated bioavailable chelating agents comprising at least one member of a first group, at least one member of a second group and at least one member of a third group,

wherein members of the first group are selected from the group consisting of R-(+)-alpha-lipoic acid, S-(-)-alpha-lipoic acid, R/S-alpha-lipoic acid, R/S-gamma-lipoic acid, other isomers of alpha lipoic acid, dihydrolipoic acid or DHLA, animal and vegetable oils, hydrocarbon oils, ester oils, silicone oils, higher fatty acids, higher alcohols, sun-screening agents, vitamins, and ferulic acid,

wherein at least about 1% of the members of the first group in the preparation are encapsulated in a microsphere or a liposome;

members of the second group are selected from the group consisting of EDTA (ethylene-diaminetetraacetic acid), ethyleneglycol-bis[beta-aminoethyl ether]-N,N'-tetra-acetic acid (EGTA), diethylenetriamine-pentaacetic acid (DTPA), triethylenetetraaminehexaacetic acid (TTHA), N-hydroxyethylenediaminehexaacetic-acid (HEDHA), 1,4,7-triazacyclononane-N,N',N''-triacetic acid (NOTA), 1,4,7,10-tetraazacyclododecane-N,N',N'',N'''-tetraacetic acid (DOTA), N'-hydroxy-ethylenediamine-N,N,N'-triacetic acid (HEDTA), other polyaminopolycarboxylic acids, iminodiacetic acid (IDA), cyclam, penicillamine, dimercaptosuccinic acid, tartrate, thiomalic acid, crown ethers, nitrilotriacetate acid (NTA), 3,6-dioxaoctanedithioamide, 3,6-dioxaoctanediamide, salicyladoximine, dithio-oxamide, 8-hydroxyquinoline, cupferron, 2,2'-thiobis(ethyl acetoacetate), 2,2'-dipyridyl, and derivatives thereof,

wherein at least about 1% of the members of the second group in the preparation are encapsulated in a microsphere or a liposome; and

members of the third group are selected from the group consisting of lecithin, phosphatidylcholine, phosphatidylserine, phosphatidylethanolamine, dilinoleylphosphatidylcholine, lysolipids, dipalmitoylphosphatidylcholine, distearoylphosphatidylcholine, phosphatidylcholine, phosphatidic acid, sphingomyelin, cholesterol, cholesterol sulfate, cholesterol hemisuccinate, tocopherol hemisuccinate, phosphatidylethanolamine, phosphatidylinositol, fatty acids, palmitic acid, stearic acid, oleic acid, linolenic acid, linoleic acid, glycosphingolipids, glucolipids, glycolipids, sulphatides, lipids bearing sulfonated mono-, di-, oligo- or polysaccharides, lipids with ether and ester-linked fatty acids, triglycerides, lipoproteins, cholesterol, a lipid and a polymerized lipid,

wherein at least about 1% of the members of the third group in the preparation are encapsulated in a microspheres or a liposome, and the microsphere or liposome comprises a member of the third group,

wherein optionally at least about 2%, 3%, 4%, 5%, 6%, 7%, 8%, 9%, 10%, 11%, 12%, 13%, 14%, 15%, 16%, 17%, 18%, 19%, 20%, 21%, 22%, 23%, 24% or 25% of the one or more members from the first, second or third group in the preparation are encapsulated in a microsphere or a liposome,

wherein optionally at least about 26%, 27%, 28%, 29%, 30%, 31%, 32%, 33%, 34%, 35%, 36%, 37%, 38%, 39%, 40%, 41%, 42%, 43%, 44%, 45%, 46%, 47%, 48% or 49% of the one or more members from the first, second or third group in the preparation are encapsulated in a microsphere or a liposome,

wherein optionally at least about 50%, 51%, 52%, 53%, 54%, 55%, 56%, 57%, 58%, 59%, 60%, 61%, 62%, 63%, 64%, 65%, 66%, 67%, 68%, 69%, 70%, 71%, 72%, 73%, 74%, 75%, 76%,

77%, 78%, 79%, 80%, 81%, 82%, 83%, 84%, 85%, 86%, 87%, 88%, 89%, 90%, 91%, 92%, 93%, 94%, 95%, 96%, 97%, 98% or 99%, or more of the one or more members from the first, second or third group in the preparation are encapsulated in a microsphere or a liposome.

3. A kit or a formulation comprising two preparations, a first preparation and a second preparation, wherein said first preparation comprises a phospholipid, a chelating agent, magnesium chloride, and alpha lipoic acid; and the second preparation comprises diindolemethane, grape extract or grape skin extract or wine extract, calcium D-glucarate, medium chain triglycerides or a phospholipid or a combination thereof,

wherein optionally the grape extract or grape skin extract or wine extract is a red grape extract, a red grape skin extract or a red wine extract,

wherein optionally the chelating agent comprises EDTA (ethylene-diaminetetraacetic acid), diethylenetriamine-pentaacetic acid (DTPA), ethyleneglycol-bis[beta-aminoethyl ether]-N,N'-tetraacetic acid (EGTA), triethylenetetraaminehexaacetic acid (TTHA), N-hydroxyethylenediaminehexaacetic-acid (HEDHA), 1,4,7-triazacyclononane-N,N',N''-triacetic acid (NOTA), 1,4,7,10-tetraazacyclododecane-N,N',N'',N'''-tetraacetic acid (DOTA), N'-hydroxy-ethylenediamine-N,N,N'-triacetic acid (HEDTA), other polyaminopolycarboxylic acids, iminodiacetic acid (IDA), cyclam, penicillamine, dimercaptosuccinic acid, tartrate, thiomalic acid, crown ethers, nitrilotriacetic acid (NTA), 3,6-dioxaoctanedithioamide, 3,6-dioxaoctanediamide, salicyladoximine, dithio-oxamide, 8-hydroxyquinoline, cupferron, 2,2'-thiobis(ethyl acetoacetate), 2,2'-dipyridyl or derivatives thereof.

4. A preparation comprising diindolemethane, grape extract or grape skin extract or wine extract, calcium D-glucarate, a medium chain triglyceride, a phospholipid, and at least one vitamin B9 molecule,

wherein optionally the grape extract or grape skin extract or wine extract is a red grape extract, a red grape skin extract or a red wine extract,

wherein optionally the at least one vitamin B9 molecule is selected from the group consisting of folate, folic acid and folinic acid,

wherein optionally the vitamin B9 molecule comprises folic acid and folinic acid.

5. A kit or a formulation comprising two preparations, a first preparation and a second preparation, wherein said first preparation comprises a plant indole, indole-3-carbinol (I3C) or its dimer 3,3'-diindolylmethane (DIM), grape extract or grape skin extract or wine extract, calcium D-glucarate, medium chain triglycerides, a phospholipid, and at least one vitamin B9 molecule; and the

second preparation comprises a phospholipid, a chelating agent, magnesium chloride and alpha lipoic acid,

wherein optionally the chelating agent comprises EDTA (ethylene-diaminetetraacetic acid), diethylenetriamine-pentaacetic acid (DTPA), ethyleneglycol-bis[beta-aminoethyl ether]-N,N'-tetraacetic acid (EGTA), triethylenetetraaminehexaacetic acid (TTHA), N-hydroxyethylenediaminehexaacetic-acid (HEDHA), 1,4,7-triazacyclononane-N,N',N''-triacetic acid (NOTA), 1,4,7,10-tetraazacyclododecane-N,N',N'',N'''-tetraacetic acid (DOTA), N'-hydroxy-ethylenediamine-N,N,N'-triacetic acid (HEDTA), other polyaminopolycarboxylic acids, iminodiacetic acid (IDA), cyclam, penicillamine, dimercaptosuccinic acid, tartrate, thiomalic acid, crown ethers, nitrilotriacetic acid (NTA), 3,6-dioxaoctanedithioamide, 3,6-dioxaoctanediamide, salicyladoximine, dithio-oxamide, 8-hydroxyquinoline, cupferron, 2,2'-thiobis(ethyl acetoacetate), 2,2'-dipyridyl or derivatives thereof,

wherein optionally the at least one vitamin B9 molecule is selected from the group consisting of a folate, a folic acid and a folinic acid,

wherein optionally the vitamin B9 molecule comprises folic acid and folinic acid.

6. Use of the preparation of claim 1, or the formulation of claim 3 or claim 5, or the preparation of claim 4, or a combination thereof, in the manufacture of a detoxification agent,

wherein optionally the detoxification comprises heavy metal detoxification, and optionally the metal is arsenic, lead, cadmium or mercury,

wherein optionally the formulation or preparation is for administration by inoculation, infusion or injection, topical application or by absorption through epithelial or mucocutaneous linings.

7. A liquid, capsule, tablet or pill, food or food supplement comprising the preparation of claim 1, or formulation of claim 3 or claim 5, or preparation of claim 4, or a combination thereof,

wherein optionally the food or food supplement comprises a flavored bar, a power bar, a diet bar, an energy bar or a nutritional bar.

8. Use of the preparation of claim 1, or formulation of claim 3 or claim 5, or preparation of claim 4, in the manufacture of a medicament for the treatment or prevention of a tissue disorder, wherein optionally the tissue is a breast tissue or a prostate tissue.

9. The preparation of claim 1, the formulation of claim 3 or claim 5, or preparation of claim 4, wherein at least a fraction of the microsphere or liposome further comprises a gas comprising a nitrogen gas, oxygen gas, atmospheric air, gaseous mixtures containing nitrogen gas, gaseous mixtures containing oxygen gas, or a combination thereof, wherein the microsphere or liposome is homogeneous in size or in content, or, heterogeneous in size or in content.

10. A preparation or formulation comprising encapsulated chelating agents comprising at least one member of a first group, at least one member of a second group and at least one member of a third group,

wherein members of the first group comprise at least one hydrophobic antioxidant;

members of the second group comprises at least one chelating group; and

members of the third group comprise at least one member selected from the group consisting of lecithin, phosphatidylcholine, phosphatidylserine, phosphatidylethanolamine, dilinoleylphosphatidylcholine, lysolipids, dipalmitoylphosphatidylcholine, distearoylphosphatidylcholine, phosphatidylcholine, phosphatidic acid, sphingomyelin, cholesterol, cholesterol sulfate, cholesterol hemisuccinate, tocopherol hemisuccinate, phosphatidylethanolamine, phosphatidylinositol, fatty acids, palmitic acid, stearic acid, oleic acid, linolenic acid, linoleic acid, glycosphingolipids, glucolipids, glycolipids, sulphatides, lipids bearing sulfonated mono-, di-, oligo- or polysaccharides, lipids with ether and ester-linked fatty acids, triglycerides, lipoproteins, cholesterol, a lipid, a polymerized lipid and equivalent compounds,

wherein at least about 1% of members from the first, second or third group in the preparation are encapsulated in a microsphere or a liposome.

11. A preparation or formulation comprising at least one member of a first group and at least one member of a second group, wherein the member of the first group comprises a plant indole, and the member of the second group comprises a plant flavonoid, a polyphenol, a stilbene, a 3,5,4'-trihydroxy stilbene, a resveratrol, a piceatannol, a grape extract, a grape skin extract or a wine extract, or an equivalent compound.

12. A preparation or formulation comprising at least one member of a first group and at least one member of a second group, wherein the member of the first group comprises a plant indole, and the member of the second group comprises a D-glucaric acid, a salt of a D-glucaric acid, a potassium hydrogen D-glucarate (PHG), a derivatized D-glucaric acid, a D-glucaro-1,4-lactone, a 1,4-GL, 2-keto-3-deoxy-D-glucarate, a 4-deoxy-5-keto-D-glucarate, or an equivalent compound.

13. A preparation or formulation comprising at least one member of a first group and at least one member of a second group, wherein the member of the first group comprises a plant indole, and the member of the second group comprises a medium chain triglyceride (MCT),

wherein optionally at least half of the content of the preparation or formulation comprises at least 80% of MCTs having a length of between C<sub>5</sub> and C<sub>11</sub>,

wherein optionally the MCT is derived from coconut oil, palm kernel oil, camphor tree drupes, butter or a combination thereof,

wherein optionally the MCT comprises a lauric oil, or glycerol esters of caprylic acid, octanoic acid, capric acid or decanoic acid.

14. A preparation or formulation comprising at least one member of a first group and at least one member of a second group, wherein the member of the first group comprises a plant indole, and the member of the second group comprises lecithin, phosphatidylcholine, phosphatidylserine, phosphatidylethanolamine, dilinoleylphosphatidylcholine, lysolipids,

dipalmitoylphosphatidylcholine, distearoylphosphatidylcholine, phosphatidylcholine, phosphatidic acid, sphingomyelin, cholesterol, cholesterol sulfate, cholesterol hemisuccinate, tocopherol hemisuccinate, phosphatidylethanolamine, phosphatidylinositol, fatty acids, palmitic acid, stearic acid, oleic acid, linolenic acid, linoleic acid, glycosphingolipids, glucolipids, glycolipids, sulphatides, lipids bearing sulfonated mono-, di-, oligo- or polysaccharides, lipids with ether and ester-linked fatty acids, triglycerides, high density lipoprotein, low density lipoprotein, cholesterol, or other lipids or polymerized lipids or derivatives thereof,

wherein optionally the plant indole comprises an indole-3-carbinol (I3C) or its dimer 3,3'-diindolylmethane (DIM), grape extract or grape skin extract or wine extract.

15. A preparation or formulation comprising at least one member of a first group and at least one member of a second group, wherein the member of the first group comprises a medium chain triglyceride (MCT), and the member of the second group comprises a D-glucaric acid, a salt of a D-glucaric acid, a potassium hydrogen D-glucarate (PHG), a derivatized D-glucaric acid, a D-glucaro-1,4-lactone, a 1,4-GL, 2-keto-3-deoxy-D-glucarate, a 4-deoxy-5-keto-D-glucarate, or an equivalent compound.

16. A preparation formulated for oral administration comprising a chelating agent and a phospholipid, wherein the chelating agent and phospholipid are encapsulated in a microsphere or liposome comprising a compound selected from the group consisting of lecithin, phosphatidylcholine, phosphatidylserine, phosphatidylethanolamine, dilinoleylphosphatidylcholine, lysolipids,

dipalmitoylphosphatidylcholine, distearoylphosphatidylcholine, phosphatidylcholine, phosphatidic acid, sphingomyelin, cholesterol, cholesterol sulfate, cholesterol hemisuccinate, tocopherol hemisuccinate, phosphatidylethanolamine, phosphatidylinositol, fatty acids, palmitic acid, stearic acid, oleic acid, linolenic acid, linoleic acid, glycosphingolipids, glucolipids, glycolipids, sulphatides, lipids bearing sulfonated mono-, di-, oligo- or polysaccharides, lipids with ether and ester-linked fatty acids, triglycerides, lipoproteins, cholesterol, a lipid, a polymerized lipid and a derivatized lipid,

wherein optionally the chelating agent comprises disodium EDTA (ethylene-diaminetetraacetic acid), diethylenetriamine-pentaacetic acid (DTPA), ethyleneglycol-bis[beta-aminoethyl ether]-N,N'-tetra-acetic acid (EGTA), triethylenetetraaminehexaacetic acid (TTHA), N-hydroxyethylenediaminehexaacetic-acid (HEDHA), 1,4,7-triazacyclononane-N,N',N''-triacetic acid (NOTA), 1,4,7,10-tetraazacyclododecane-N,N',N'',N'''-tetraacetic acid (DOTA), N'-hydroxy-ethylenediamine-N,N,N'-triacetic acid (HEDTA), other polyaminopolycarboxylic acids, iminodiacetic acid (IDA), cyclam, penicillamine, dimercaptosuccinic acid, tartrate, thiomalic acid, crown ethers, nitrilotriacetic acid (NTA), 3,6-dioxaoctanedithioamide, 3,6-dioxaoctanediamide, salicyladoximine, dithio-oxamide, 8-hydroxyquinoline, cupferron, 2,2'-thiobis(ethyl acetoacetate), 2,2'-dipyridyl or derivatives thereof,

wherein optionally the phospholipid comprises alpha lipoic acid,

wherein optionally the preparation comprises disodium EDTA, phospholipid, magnesium chloride and alpha lipoic acid,

wherein optionally the preparation comprises 1 gm of disodium EDTA, 30 gm of phospholipid, 150 mg of magnesium chloride and 100 mg of alpha lipoic acid.

17. A preparation formulated for oral administration comprising indole-3-carbinol (I3C) or its dimer 3,3'-diindolylmethane (DIM), calcium D-glucarate and a red wine extract or grape extract or grape skin extract, wherein the indole-3-carbinol (I3C) or its dimer 3,3'-diindolylmethane (DIM), calcium D-glucarate and red wine extract are encapsulated in a microsphere or liposome comprising a compound selected from the group consisting of lecithin, phosphatidylcholine, phosphatidylserine, phosphatidylethanolamine, dilinoleylphosphatidylcholine, lysolipids, dipalmitoylphosphatidylcholine, distearoylphosphatidylcholine, phosphatidylcholine, phosphatidic acid, sphingomyelin, cholesterol, cholesterol sulfate, cholesterol hemisuccinate, tocopherol hemisuccinate, phosphatidylethanolamine, phosphatidylinositol, fatty acids, palmitic acid, stearic acid, oleic acid, linolenic acid, linoleic acid, glycosphingolipids, glucolipids, glycolipids, sulphatides, lipids bearing sulfonated mono-, di-, oligo- or polysaccharides, lipids with ether and ester-linked fatty acids, triglycerides, lipoproteins, cholesterol, a lipid, a polymerized lipid and a derivatized lipid,

wherein optionally the preparation further comprises a medium chain triglyceride,

wherein optionally the preparation comprises calcium, diindolylmethane, red wine extract, calcium D-glucarate, medium chain triglyceride and lecithin,

wherein optionally the preparation comprises 24 mg calcium, 100 mg diindolylmethane, 200 mg red wine extract, 200 mg calcium D-glucarate, 45 mg medium chain triglyceride and 45 mg lecithin.

18. A preparation or formulation comprising at least one member of a first group and at least one member of a second group, wherein the member of the first group comprises a plant indole, and the member of the second group comprises a fat soluble vitamin or equivalent compound,

wherein optionally the fat soluble vitamin or equivalent compound comprises vitamin A, D, E or K, retinol, retinol derivatives, retinoic acid, carotenoids, lycopene, lutein, 1,25-dihydroxyvitamin D, calciferol, calcipotriol, cholecalciferol, ergocalciferol (vitamin D2), irradiated ergocalciferol, alpha tocopherol, tocopherol, tocopheryl acetate, tocopheryl succinate, phylloquinones, menaquinones, menadione or menatetrenone (vitamin K2).

19. A preparation or formulation comprising at least one member of a first group and at least one member of a second group, wherein the member of the first group comprises a plant indole, and the member of the second group comprises a lycopene, carotenoid, carotenes, xanthophyll, alpha-carotene, beta-carotene, lutein, cyptoxanthin, zeaxanthin or a plant-derived lycopene,

wherein optionally the plant-derived lycopene comprises a blueberry-derived or a tomato-derived lycopene.

20. A preparation or formulation comprising at least one member of a first group and at least one member of a second group, wherein the member of the first group comprises a medium chain triglyceride (MCT), and the member of the second group comprises a fat soluble vitamin or equivalent compound,

wherein optionally the fat soluble vitamin or equivalent compound comprises vitamin A, D, E or K, retinol, retinol derivatives, retinoic acid, carotenoids, lycopene, lutein, 1,25-dihydroxyvitamin D, calciferol, calcipotriol, cholecalciferol, ergocalciferol (vitamin D2), irradiated ergocalciferol, alpha tocopherol, tocopherol, tocopheryl acetate, tocopheryl succinate, phylloquinones, menaquinones, menadione or menatetrenone (vitamin K2).